

REMARKS

Claims 9-19 are pending in the Application.

Claims 13 and 18 stand objected to.

Claims 9-19 stand rejected.

I. OBJECTIONS TO CLAIMS 13 AND 18

The Examiner objects to claims 13 and 18 as being unclear because the term "graphite diamond" is unclear in light of the Specification. *See* Office Action mailed 04/07/2005, ¶1. The term "graphite diamond" appears in the text of the Specification, which states, "The carbon cold cathode may consist of carbon nanotubes (single wall and multiwall) and carbon thin films, including diamond-like carbon and mixtures of amorphous carbon, graphite diamond and fullerene-type of carbon materials." *See* Specification, page 5, ¶2. In the context of the Specification and claims 13 and 18, a person of ordinary skill in the art of electron emissions and nanotechnology would understand the term "graphite diamond." The term is not unclear in light of the Specification, and Applicant respectfully requests the Examiner withdraw the objections to claims 13 and 18.

II. REJECTIONS UNDER 35 U.S.C. § 112

Claims 11 and 17 stand rejected under 35 U.S.C. § 112 ¶1 because the "original specification does not teach the cold cathode comprising amorphous diamond." *See* Office Action ¶2. Further, "it is unclear what constitutes amorphous diamond." *See id.* This rejection is traversed. Claim 17 does not contain the term "amorphous diamond;" however, claim 16 does contain the term. Therefore, Applicants address the rejections to claims 11 and 17 as rejections to claims 11 and 16.

Claims 11 and 16 recite the limitation "wherein the cold cathode comprises amorphous diamond emitters." In the context of the Specification and claims 11 and 16, this recitation would be clear to one of ordinary skill in the art. The Specification

discloses that "any cold cathode emitter could be utilized, such as ... amorphous diamond emitters." See Specification, page 3, ¶4. Therefore, the Specification provides support for the term and, in the context of the Specification, one of ordinary skill in the art would understand the claim term "amorphous diamond emitters." Therefore, Applicants respectfully request the withdrawal of rejections of claims 11 and 16 based on the term "amorphous diamond."

## II. REJECTIONS UNDER 35 U.S.C. § 102(b)

Claims 7-9 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,426,507 ("*Rangwalla*"). A claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference. MPEP § 2131. Applicants traverse the rejections to claims 7-9 because *Rangwalla* does not disclose every element of the claims.

Claim 7 recites "a cold cathode, wherein the cold cathode is substantially flat." The Specification indicates that "any cold cathode emitter could be utilized, such as a carbon cold cathode, a micro-tip array, a film of carbon nanotubes, amorphous diamond emitters, etc." See Specification, page 3, ¶4. The Examiner apparently ignores the recitations for a cold cathode. See Office Action, ¶3. Instead, the Examiner relies on *Rangwalla's* item 112, which is disclosed as a filament. *Rangwalla's* filament shown as item 112 is not a cold cathode. In fact, *Rangwalla* discloses that "Filament 112 then glows white hot and generates a cloud of electrons." *Rangwalla*, col. 4, lines 40-42. Further, *Rangwalla* discloses that the "tungsten filament is heated to about 2400 K." See *Rangwalla*, col. 1, lines 41-42. *Rangwalla's* white hot filament is not a cold cathode. Therefore, *Rangwalla* does not disclose every limitation of claim 7 and claim 7 is allowable under 35 U.S.C. § 102 over *Rangwalla*. Accordingly, Applicants respectfully request the withdrawal of any claim rejections based on *Rangwalla*.

Claims 8-9 recite similar limitations for "cold cathode." Claim 8-9 stand rejected for the same reasons as claim 7. Therefore, for the reasons stated above with regard to claim 7, claims 8-9 are allowable over *Rangwalla* and the corresponding rejections should also be withdrawn.

III. REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 10-13 and 15-18 stand rejected under 35 U.S.C. § 103(a) as obvious over *Rangwalla* in view of U.S. Patent No. 6,057,637 ("*Zettl*"). Hindsight reconstruction is impermissible—the Federal Circuit forbids using the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art as a basis for obvious rejections. *In re Rouffet*, 149 F.3d 1350 (Fed. Cir. 1998) & *In re Fritch*, 972 F.2d 12609 (Fed. Cir. 1992). Applicants respectfully assert the Examiner has used hindsight in piecing together the teachings of the prior art to find a basis to reject claims 10-13 and 15-18. Accordingly, Applicants respectfully request the withdrawal of the rejections of claims 10-13 and 15-18.

As discussed above, *Rangwalla* relates to a particle beam processing apparatus that generates an electron cloud by heating at least one tungsten filament. See ABSTRACT. The combination of *Rangwalla* and *Zettl* cited by the Examiner does not disclose any cold cathode as recited in claim 7. Claims 10 and 12 depend from claim 7 and therefore recites the limitations of claim 7.

Regarding claim 11, *Zettl*, taken alone or in combination with the other references, does not disclose any cold cathode that comprises amorphous diamond emitters, as claimed in the present application. Similarly, regarding claim 13, no combination of *Zettl* and the other references discloses any cold cathode that comprises a mixture of amorphous carbon, graphite diamond, and fullerene-type carbon materials. *Zettl* discloses a field emission source comprising a volume of binder and a volume of nanotubes suspended in the binder, where the nanotubes are made essentially from carbon or the combination of carbon, boron, and nitrogen. See *Zettl*, col. 2, lines 21-26. Nowhere does the combination of *Rangwalla* and *Zettl* teach or suggest any amorphous diamond emitters as claimed in the present application. For at least these reasons, claims 11 and 13 are allowable.

In addition to not disclosing every element of the rejected claims, there is no motivation to combine *Rangwalla* and *Zettl*. *Zettl* and *Rangwalla* are fundamentally different. *Zettl* states as an objective "to provide a field emission electron source ...that do[es] not require ultra high vacuum. See *Zettl*, Col. 1, line 67-Col. 2, line 3.

Contrary to this stated objective of *Zettl*, *Rangwalla* discloses a vacuum chamber shown as item 114 that houses a hot filament shown as item 112. *Rangwalla*, vol. 4, lines 35-37 & Fig. 1.

The Examiner states as motivation that it would have been obvious "to employ a plurality of carbon nanotubes, graphite diamond, amorphous diamond, or a mixture of these materials with amorphous carbon...and one would have been motivated to do so because as *Zettl* teaches, carbon nanotubes are capable of providing a reliable, nonfragile, and robust cold cathode (field emission) electron sources." These are the Examiner's subjective opinions and do not represent objective evidence that one of ordinary skill in the art would have been motivated, at the time the invention was made, to combine or modify the references to reach the claimed subject matter.

Claims 15-18 recite limitations similar to claims 10-13 and for the reasons stated above, claims 15-18 are allowable over *Rangwalla* in view of *Zettl*. Therefore, claims 10-13 and 15-18 are allowable over *Rangwalla* in view of *Zettl*.

Claims 14 and 19 stand rejected under 35 U.S.C. § 103(a) as obvious over *Rangwalla* in view of *Goth* (U.S. Patent No. (2002/0006489)). Claims 14 and 19 depend from claims 7 and 8, respectively. As stated above, *Rangwalla*, taken alone or in combination with the other references, does not disclose every element of claim 7 or 8. For example, *Rangwalla* does not disclose a cold cathode, but instead discloses a hot tungsten filament. Further, there is no motivation to combine *Rangwalla* and *Goth*. The Examiner states as motivation, it would have been obvious "to employ an envelope structure with five walls, as commonly employed in the art; and one would have been motivated to do so because this would provide a stable structure of the field emission device." See Office Action mailed 4/7/2004, ¶ 5. These are the Examiner's subjective opinions and are unsupported by objective evidence for combining the references. Therefore, claims 14 and 19 are allowable over the cited references and Applicants respectfully request the withdrawal of the rejections to these claims.

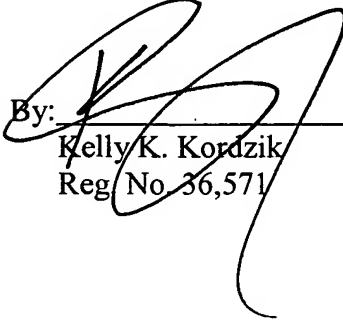
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Respectfully submitted,

WINSTEAD SECHREST & MINICK P.C.

Attorney for Applicants

By:   
Kelly K. Kordzik  
Reg. No. 36,571

P.O. Box 50784  
Dallas, Texas 75201  
(512) 370-2851

Austin\_1\290601\1  
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